sub·stan·tial

sub·stan·tial (səb-stăn'shəl) *adjective*

1. Of, relating to, or having substance; material.
2. True or real; not imaginary.
3. Solidly built; strong.
4. Ample; sustaining: *a substantial breakfast.*
5. Considerable in importance, value, degree, amount, or extent: *won by a substantial margin.*
6. Possessing wealth or property; well-to-do.

noun

1. An essential. Often used in the plural.
2. A solid thing. Often used in the plural.

[Middle English *substancial*, from Old French *substantiel*, from Latin *substanti lis*, from *substantia*, substance. See substance.]

— **sub·stan ti·al i·ty** (-shē ăl ĭ tē) or **sub·stan tial·ness** (-shəl nĭs) *noun*

— **sub·stan tial·ly** *adverb*

u·ni·form

u·ni·form (yo͞o′nə-fôrm′) *adjective*

1. Always the same, as in character or degree; unvarying.
2. Conforming to one principle, standard, or rule; consistent.
3. Being the same as or consonant with another or others.
4. Unvaried in texture, color, or design. See synonyms at steady.

noun

1. A distinctive outfit intended to identify those who wear it as members of a specific group.
2. One set of such an outfit.

verb, transitive

u·ni·formed, u·ni·form·ing, u·ni·forms

1. To make (something) uniform.
2. To provide or dress with a uniform.

[Latin *niformis* : *ni-*, uni- + *f rma*, shape.]

— u ni·for mi·ty or u ni·form ness (y n -fôrm) *noun*

— u ni·form ly *adverb*

DOCUMENT-IDENTIFIER: US 20010003058 A1

TITLE: Flip chip with integrated flux and underfill

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Detail Description Paragraph - DETX (18):
[0034] The positioned chip is then run through a solder reflow line commonly used for assembly. A multi-zone oven, with individual heat controls that permit a heating profile is preferred. The flux melts at a temperature ranging from about 80.degree. C. to about 140.degree. C. The melting point is determined by selecting fluxes having epoxy resins with the appropriate melting point. The flux/hardener, formed of one or more carboxylic acids, one or more acid anhydrides, or a combination of both, reduces oxides present on the solder or the metal surface in contact with the solder and allows solder joints to form at the substrate pads. The liquefied flux/underfill also wets the substrate and begins to bond. As the ambient temperature increases, (by moving the assembly into hotter oven zones), the flux-hardener reacts with the epoxy resins to form a mostly linear, or thermoplastic, polymer with a final softening point of at least 130.degree. C. and up to about 190.degree. C. The final softening point is determined by the melting point of the initial resins and the particular type or hardener selected. The final temperature should be selected so that it is not so low that the underfill material softens during device use, nor should it be so high as to result in excessive reworking temperatures.

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(54) FLIP CHIP WITH INTEGRATED FLUX AND UNDERFILL

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(57) ABSTRACT

A flip chip having solder bumps and an integrated flux and underfill, as well as methods for making same a device, is described. The resulting device is well suited for a simple one-step application to a printed circuit board, thereby simplifying flip chip manufacturing processes which heretofore have required separate fluxing and underfilling steps.